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SPECIFICATION FOR COTTON YARN FOR COVERING CONDUCTORS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR COTTON YARN FOR COVERING CONDUCTORS

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(*Continued on page 2*)

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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2. GENERAL REQUIREMENTS

2.1 The yarn shall be manufactured from good quality cotton. It shall be combed, evenly spun, and shall be free from leaf particles, neps, snarls, slubs and other defects.

2.1.1 The yarn shall be supplied in cones, cheeses or tubes. All broken ends in the cones, cheeses or tubes shall be properly pieced.

3. SPECIFIC REQUIREMENTS

3.1 The yarn of various counts shall conform to the requirements specified in Table 1. A tolerance of ± 5 percent in the count of yarn shall be permissible.

TABLE 1 PARTICULARS OF COTTON YARN FOR COVERING CONDUCTORS

COTTON COUNT (OR *UNIVERSAL COUNT, IN tex)	BREAKING LOAD, IN kg OF 100 m SKEIN *Min*
60s (or 10 tex)	21
80s (or 7·4 tex)	15
100s (or 6·0 tex)	12
120s (or 5·0 tex)	11

*Universal count in tex — the number of grams per kilometre.

3.2 The cotton count of yarn shall be determined by the method prescribed in **4** to **8.1** of IS : 237-1951*.

3.2.1 The universal count of yarn, in tex, shall be determined by the method prescribed in **4** to **8.3** of IS : 237-1951*.

3.3 The skein breaking load of yarn shall be determined by the method prescribed in **6.2** to **7.2** of IS : 1671-1960†.

3.4 Water Solubles — The total water soluble matter of yarn shall not exceed 1·5 percent on the conditioned weight of the test specimen.

3.4.1 Water soluble matter of yarn shall be determined by the method prescribed in IS : 3456-1966‡.

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*Method for determination of cotton yarn count (or yarn melidity in tex).

†Method for determination of skein breaking load (strength), tenacity and yarn strength index of cotton yarn (by constant-rate-of-traverse machine).

‡Method for determination of water soluble matter of textile materials.

AMENDMENT NO. 1 MARCH 1979

TO

IS : 3567-1966 SPECIFICATION FOR COTTON YARN FOR COVERING CONDUCTORS

Alterations

(*Page* 4, *clauses* 3.2 *and* 3.2.1) — Substitute the following for the existing clauses:

'3.2 The count of yarn shall be determined by the method prescribed in IS : 1315-1977*.'

(*Page* 4, *foot-note* with ' * ' *mark*) — Substitute the following for the existing foot-note:

'*Method for determination of linear density of yarns spun on cotton system (*first revision*).'

Addenda

(*Page* 5, *clause* 3.6.3) — Add the following new clauses after 3.6.3:

'3.7 ***p*H Value** — The *p*H value of yarn shall be not less than 6·0 nor more than 8.5.

3.7.1 The *p*H value of yarn shall be determined by the method prescribed in IS : 1390-1961‡.'

(*Page* 5, *foot-note* with ' † ' *mark*) — Add the following new foot-note after ' † ' mark:

'‡Methods for determination of *p*H value of aqueous extracts of textile materials.'

(TDC 2)

3.5 Conductivity of Water Extract — The conductivity of water extract of yarn shall not exceed 100 micromhos per centimetre.

3.5.1 The conductivity of water extract of yarn shall be determined by the method prescribed in Appendix A.

3.6 Ether Extractable Matter — The total ether extractable matter of yarn shall not exceed 3 percent.

3.6.1 The acid value of the ether extractable matter of yarn shall not exceed 1·12 mg of potassium hydroxide per gram of ether extractable matter.

3.6.2 The ester value of the ether extractable matter of yarn shall not exceed 1·88 mg of potassium hydroxide per gram of ether extractable matter.

3.6.3 The ether extractable matter of yarn and the acid and the ester values of the ether extractable matter of yarn shall be determined by the method prescribed in Appendix B.

4. PACKING

4.1 The yarn shall be packed in accordance with the procedure laid down in **2.6** of either IS : 1347-1959* or IS : 293-1959†, as required.

5. MARKING

5.1 The cases containing yarn shall be marked with the following:

a) Name of the material;
b) Count of yarn (in cotton count and tex);
c) Gross weight of the case;
d) Net weight of the case;
e) Name of the manufacturer, initials or trade-mark, if any; and
f) Any other information required by the buyer or by the law in force.

5.1.1 Each case may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

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*Code for inland packaging of cotton cloth and yarn.

†Code for seaworthy packaging of cotton cloth and yarn (*revised*).

6. SAMPLING

6.1 Lot — All the cases of cotton yarn of the same count and quality delivered to one buyer against one despatch note, shall constitute a lot.

6.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of tests carried out on the yarn selected from it.

6.3 Unless otherwise agreed to between the buyer and the seller the number of cases to be selected at random from the lot shall be in accordance with col 2 of Table 2.

TABLE 2 NUMBER OF CASES TO BE SELECTED

LOT SIZE (NO. OF CASES) (1)	NO. OF CASES TO BE CHOSEN (2)
1 and 2	All
3 to 8	3
9 „ 15	4
16 „ 25	5
26 „ 40	7
41 and above	10

6.3.1 In order to ensure randomness of selection of cases, random number tables may be used:

NOTE — In case such tables are not available, the following procedure may be adopted:

Starting from any case in the lot, the cases in the lot shall be serially numbered as 1, 2, 3.................up to r where r is the integral part of $\frac{N}{n}$, N being lot size and n number of cases to be selected. Every rth case thus counted shall be removed until the requisite number is obtained.

6.4 From each case, 5 packages consisting of cones, cheeses or tubes shall be selected at random. In case the total number of cones, cheeses or tubes selected is less than 15, additional packages from the same lot shall be selected so as to make the total number 15. From each such package only one test specimen of adequate length shall be selected (discarding at least first 50 m from the package) for each of the requirements mentioned in 3.

6.5 Criteria for Conformity — The lot shall be considered to be in conformity with the requirements of this standard, if the number of packages failing to satisfy the requirements of any characteristic does not exceed the corresponding number given in Table 3.

TABLE 3 CRITERIA FOR CONFORMITY

No. of Packages Tested	Permissible No. of Failures
15	1
20	1
25	1
35	2
50	3

APPENDIX A

(*Clause* 3.5.1)

METHOD FOR DETERMINATION OF CONDUCTIVITY OF WATER EXTRACT

A-1. TEST SPECIMENS

A-1.1 Cut one test specimen, weighing approximately 5 g from each package constituting the sample under test (*see* **6.4**).

A-2. APPARATUS

A-2.1 Reagent Bottle — with glass stopper, 500 ml capacity.

A-2.2 Immersion Electrodes — with platinum electrodes approximately 1 cm square.

A-2.3 Resistance Meter — using alternating current of 50 to 1 000 c/s frequency.

A-2.4 Thermostat — capable of maintaining a temperature of 25°C.

A-3. REAGENTS

A-3.0 Quality of Reagents — Unless specified otherwise, pure chemicals shall be employed in test and distilled water (*see* IS : 1070-1960*) shall be used where the use of water or distilled water as a reagent is intended.

Note — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the experimental results.

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*Specification for water, distilled quality (*revised*).

A-3.1 Potassium Chloride Solution — 0·001 molar solution (0·0746 g/l).

A-4. PROCEDURE

A-4.1 Cut one test specimen into small bits using sterilized stainless steel, chromium plated or nickel plated scissors, taking care not to contaminate the test specimen.

A-4.2 Calibrate the immersion electrode by using 0·001 molar solution of potassium chloride. Calculate the cell constant from the measurement at 25°C of the resistance of this solution and that of distilled water used to prepare it by the following formula:

$$K = \frac{147{\cdot}4}{10^6\left(\frac{1}{R_{KCl}} - \frac{1}{R_{H_2O}}\right)}$$

where

K = cell constant;

R_{KCl} = resistance, in ohms of the 0·001 molar solution of potassium chloride; and

R_{H_2O} = resistance, in ohms, of the distilled water.

A-4.3 Rinse the reagent bottle with distilled water and drain it. Place the test specimen in the reagent bottle and add 500 ml of distilled water. Tie the stopper in place and shake the bottle vigorously by hand for 30 seconds to ensure that the material is thoroughly wetted. Complete the extraction by shaking the bottle periodically for one hour at boiling temperature. Insert the immersion electrode into the extract in the bottle and agitate the electrode to disperse any small amount of distilled water adhering. Maintain the extract and the electrode at 25°C using the thermostat. Measure the resistance.

A-4.4 Carry out a blank test with distilled water used for preparing the extract.

A-4.5 Calculate the conductivity of the water extract by the following formula:

$$C = \frac{K \times 10^6}{R_E} - \frac{K \times 10^6}{R_W}$$

where

C = conductivity, in micromhos per centimetre;

K = cell constant (*see* **A-4.2**);

R_E = resistance, in ohms, of the extract (*see* **A-4.3**); and

R_W = resistance, in ohms, of the distilled water used for preparing the extract (*see* **A-4.4**).

A-4.6 Repeat the test with remaining test specimens, draining the electrode after each test.

APPENDIX B

(*Clause* 3.6.3)

METHOD FOR DETERMINATION OF TOTAL ETHER SOLUBLE MATTER

B-1. TEST SPECIMEN

B-1.1 Cut a test specimen weighing approximately 10 g from each package constituting the sample under test (*see* **6.4**).

B-2. APPARATUS

B-2.1 Soxhlet Extractor

B-2.2 Reflux Condenser

B-3. REAGENTS

B-3.0 Quality of Reagents — Unless specified otherwise, pure chemicals shall be employed in tests, and distilled water (*see* IS : 1070-1960*) shall be used where the use of water or distilled water as a reagent is intended.

Note — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the experimental results.

B-3.1 Benzene

B-3.2 Ethyl Ether — redistilled, dried.

B-3.3 Ethyl Alcohol — 60° overproof.

B-3.4 Standard Hydrochloric Acid — 0·5 N.

B-3.5 Phenolphthalein Indicator Solution — alcoholic, 0·5 percent and percent.

B-3.6 Potassium Hydroxide Solution — alcoholic, 0·1 N.

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*Specification for water, distilled quality (*revised*).

B-4. PROCEDURE

B-4.1 Weigh accurately one test specimen and place it in a thimble in a soxhlet extractor. Extract the test specimen with pure dried redistilled ethyl ether for three hours, the extractor siphoning at least six times per hour.

B-4.2 Reduce the extract, if necessary, by subsequent distillation to a volume of approximately 25 ml. Filter the extract through a small rapid filter paper and collect in a 50 ml tared flask. Wash the filter paper and extraction flask with small portions of ether and add these washings to the extract.

B-4.3 Distill the extract obtained as in **B-4.2** on a steam-bath to remove the solvent as completely as possible. Dry the residue in the flask at 60° to 70°C to a constant weight.

B-4.4 Calculate the amount of ether soluble matter by the following formula:

$$\text{Amount of ether soluble matter, percent} = \frac{w_1}{w_2} \times 100$$

where

w_1 = weight, in g, of residue, that is ether soluble matter (*see* **B-4.3**); and

w_2 = weight, in g, of test specimen (*see* **B-4.1**).

B-4.5 Acid Value

B-4.5.1 Prepare a solvent by adding 1 ml of one percent alcoholic phenolphthalein to 20 ml of ethyl alcohol (60° overproof) and 20 ml of benzene. Boil the mixture and neutralize it while still hot (above 70°C) with 0·1 N alcoholic potassium hydroxide.

B-4.5.2 Dissolve the residue (*see* **B-4.3**) in 10 ml of solvent prepared as in **B-4.5.1**. Boil the solution and titrate it rapidly while still hot with 0·1 N alcoholic potassium hydroxide solution. Shake the flask frequently during the titration. The end point is reached when one drop produces a slight but definite colouration which persists for 5 seconds.

B-4.5.3 Calculate the acid value by the following formula:

$$\text{Acid value} = \frac{V_1}{W_1} \times 5{\cdot}61$$

where

V_1 = volume, in ml, of 0·1 N potassium hydroxide (*see* **B-4.5.2**); and

W_1 = weight, in g, of residue, that is, ether soluble matter (*see* **B-4.3**).

B-4.6 Ester Value

B-4.6.1 Add 10 ml of 0·5 N alcoholic potassium hydroxide to the contents of the flask (*see* **B-4.5.2**). Boil the liquid continuously under a reflux condenser for one hour, swirling the flask at frequent intervals.

B-4.6.2 Add 0·5 ml of one percent alcoholic phenolphthalein to the hot solution (*see* **B-4.6**). Determine the excess of alkali by titrating with 0·5 N hydrochloric acid.

B-4.6.3 Carry out a blank test at the same time in which 10 ml of the neutralized alcohol-benzene solvent and 10 ml of 0·5 N alcoholic potassium hydroxide solution are refluxed under the same conditions.

B-4.6.4 Calculate the ester value by the following formula:

$$\text{Ester value, mg per gram} = \frac{(V_2 - V_3) \times 28\cdot05}{W_1}$$

where

V_2 = volume in ml, of 0·5 N acid required for blank test (*see* **B-4.6.3**);

V_3 = volume, in ml, of 0·5 N acid required to neutralize the excess alkali after saponification (*see* **B-4.6.2**); and

W_1 = weight in g, of residue, that is, ether soluble matter (*see* **B-4.3**).

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